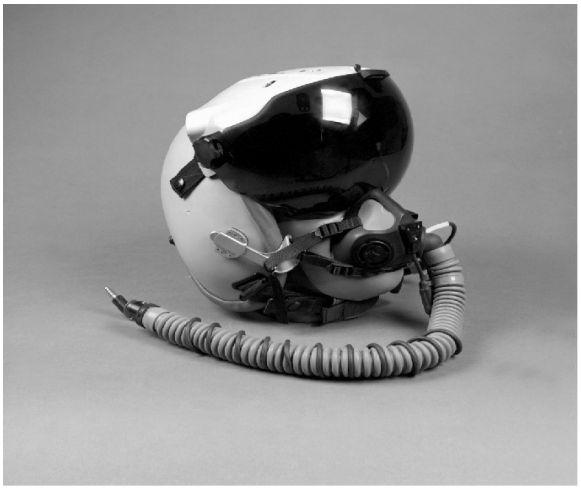
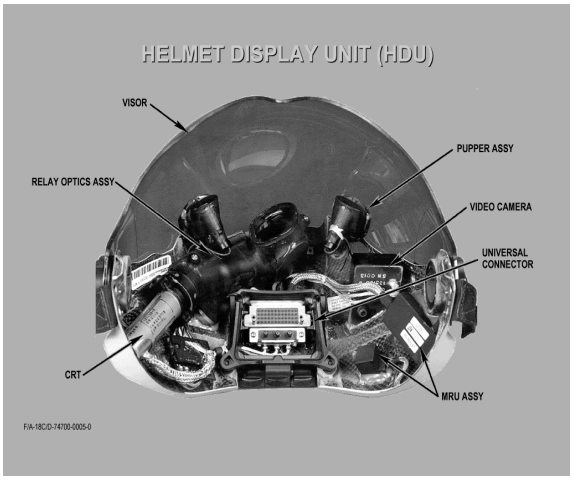
JOINT HELMET MOUNTED CUEING SYSTEM (JHMCS)





Air Force/Navy ACAT III Program

Total Number of Systems:	1,720 (w/o FMS or 18C/D buy)
Total Program Cost (TY$):	EMD - $94M// LCC ~ $300M
Average Unit Cost (TY$):	~ $257K (platform dependent)

Prime Contractor

VSI (Major Subcontractor)

SYSTEM DESCRIPTION & CONTRIBUTION TO JOINT VISION 2020

The Joint Helmet Mounted Cueing System (JHMCS) uses a modified HGU-55/P helmet that incorporates a visor-projected Heads-Up Display (HUD) to cue weapons and sensors to the pilot. The system relies on a magnetic transmitter unit fixed to the pilot's seat and a magnetic field probe mounted on the helmet to define helmet pointing positioning. A Helmet Vehicle Interface (HVI) interacts with the aircraft system bus to provide signal generation for the helmet display.

This new cueing system will bring significant performance improvement in the Air-to-Air and Air-to-Ground missions. Presently, to engage a threat aircraft or to train targeting sensors on a ground target, the pilot must maneuver his aircraft to align his radar or fixed HUD line-of-sight with that target. The Joint Helmet Mounted Cueing System will allow the pilot to cue onboard systems with the movement of his head and display weapon system symbology while reducing pilot cockpit workload by providing aircraft performance information without the need to physically glance at the instrument panel. That information will now be projected where it will be continually in the pilot's field of view. Increased situational awareness will be realized by providing off boresight target capabilities and reactive threat cueing through integration of cockpit systems. Cueing from systems such as Advanced Targeting Forward Looking Infrared (ATFLIR) and Advanced Electronically Scanned Antenna (AESA) radar will enhance precision guided munitions employment. The projected firepower from Joint fighter aircraft utilizing this key warfighting improvement will be a major contributor to the ***Joint Vision 2020*** concept of ***precision engagement***.

BACKGROUND INFORMATION

The Joint Mission Need Statement dates back to January 1994, with Milestone II decision to enter EMD on December 10, 1996. The Operational Assessment began in August 1999 and was completed in February 2000, resulting in a successful Low Rate Initial Production decision on May 25, 2000. OPEVAL in the FA-18E/F is planned for 1QFY02 followed by Milestone III in April 2002.

The JHMCS system will be employed in the FA-18C/D/E/F, F-15C/D, F-22 and F-16 Block 40/50, with a design that is 95 percent common to all four platforms. When used in conjunction with the AIM-9X missile, the High Off-Boresight features of each system are maximized. Presently, JHMCS is slated to IOC in time to make the second deployment of FA-18E/F in FY03, and the third deployment should add the AIM-9X in FY05. F-15 IOT&E is scheduled for 4QFY01 with IOC scheduled for 3QFY03. The Requested Assets Available (RAA) for USAF F-16 is scheduled for 4QFY03. The F-22 is scheduled to IOC in December 2005.

Initial DT results using the FA-18C/D and F-15C found significant reliability and maintainability issues (particularly with the FA-18C/D) with the connector between the helmet and the aircraft—called the Helmet Vehicle Interface. It was also recommended that pilot training be conducted on the visor focal length issues and cockpit scan practices prior to flying with the new helmet. The Operational Assessment on the FA-18C/D was awarded a potentially effective and a potentially not suitable report due to numerous breaks in the HVI with long fix times and an usually high BIT false alarm rate. Initial F-15C flight tests found that the legacy computer throughput provided slow support to the JHMCS. This computer latency problem, coupled with the F-15C high Analyses Of Alternatives buffet affected target designation performance. Significant improvement was made when the AIM-9X received a software change to expand the field of regard, thus allowing locks in all flight conditions.

Helmet Vehicle Interface reliability was increased by replacing the failure prone coaxial cable with twisted shielded pair wiring. The in-line release connector disconnects were corrected by re-routing the cable and adding an exo-shell to eliminate side load effects within the cockpit. The maintainability issue was corrected by re-designing the FA-18E/F connector to allow the ability to re-mate, as in the F-15C connector, and to provide limited O-level repair capability.

The Joint Helmet Mounted Cueing System is currently under a DOD IG audit, which began in June 2000 and is due to outbrief in 1QFY01.

TEST & EVALUATION ASSESSMENT

The Joint Helmet Mounted Cueing System is on track and has demonstrated few integration issues with the AIM-9X system with the FA-18 and F-15 platforms. Performance data acquired using AIM-9X captive-carry missiles and missile live-fires are being analyzed. Early involvement and identification of cockpit/helmet interface problems has corrected this reliability issue. No major performance shortcomings are envisioned at this time.